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NORTHERN PLAINS RESOURCE COUNCIL

PLEASE RETURN

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December 26, 1980

Leo Berry, Jr.
Commissioner, Montana Department
of State Lands
1625 Eleventh Avenue
Helena, Montana

Donald Crane
Regional Director, U.S. Office of Surface
Mining, Reclamation and Enforcement
1020 15th Street
Denver, Colorado 80202

STATE DOCUMENTS COLLECTION
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HELENA, MONTANA 59620

Dear Mr. Berry and Mr. Crane:

Enclosed please find the Petition for designation of certain lands as unsuitable for coal mining as supplemented in accordance with your letters of December 19, 1980. The petition has been supplemented by an affidavit and revised text relative to field inspections and soil sampling; in addition, the petition contains a revised text more specifically describing the lands to be included within the petition area.

We trust that the petition, as supplemented, meets the concerns you have expressed. The additional information provided is intended to ensure the petition is complete.

Sincerely yours,

Helen Waller (JAP)
HELEN WALLER
Chairman, Northern Plains Resource
Council
419 Stapleton Building
Billings, Montana 59101
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JAPatten
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STATE OF MONTANA

BEFORE THE DEPARTMENT OF STATE LANDS

U.S. DEPARTMENT OF THE INTERIOR

BEFORE THE OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the matter of)
)
Designating Certain)
Lands in Rosebud and)
Powder River Counties,)
Montana, as Unsuitable)
for Surface Coal Mining)
Operations)
)

PETITION

COMES NOW the Northern Plains Resource Council ("NPRC"), the Tongue River Agriculture Protection Association ("TRAPA"), the Tri-County Ranchers Association ("TCRA"), and the Rosebud Protective Association ("RPA") who hereby petition the Montana Department of State Lands ("DSL") and the U.S. Office of Surface Mining, Reclamation and Enforcement ("OSM") to designate certain lands in Rosebud and Powder River Counties, Montana, more particularly described below, as unsuitable for surface coal mining operations.

The Petitioners seek this designation pursuant to the provisions of the Surface Mining Control and Reclamation Act, 30 U.S.C. sections 1201 et seq., and the Montana Strip and Underground Mine Reclamation Act, sections 82-4-201 et seq., and regulations and programs promulgated thereunder. The grounds for this Petition for Designation are as follows:

(A) Reclamation of the lands is neither technologically nor economically feasible under either the federal or the state act, the federal regulatory program or the state regulatory program. 30 U.S.C. §1272(a)(2); 30 CFR §762.11(a); 30 CFR Parts 764 and 769; §82-4-228(2)(a) MCA; ARM 26.4.1141 through 26.4.1148.

(B) Mining will affect renewable resource lands which would suffer a substantial loss or reduction of long-range productivity of water supply and of food and fiber products. 30 U.S.C. §1272(a)(3)(B); 30 CFR §762.11(b)(3); 30 CFR Parts 764 and 769; §82-4-228(2)(b)(iii) MCA; ARM 26.4.1141 through 26.4.1148.

INTRODUCTION

1. As set out in more detail below, the available data demonstrate that:

(A) Reclamation of the petition area after surface coal mining operations would be economically and technologically infeasible.

(B) Surface coal mining on the scale contemplated in the petition area would adversely affect water quality and reduce the productivity of renewable resource agricultural lands in the petition area and downstream in the Tongue River drainage.

2. A proposal to construct a railroad to the petition area makes timely the consideration of the cumulative impacts of several strip mines. Wesco Resources, Inc., managing partner of the proposed Tongue River Railroad has claimed a minimum of 30 million tons per year coal production could be expected by 1990 from the area to be served by the railroad. See Exhibit 1, attached hereto and incorporated herein.

3. The Tongue River Valley and lands along its tributaries are important renewable resource lands. In 1975 the Montana Department of Natural Resources and Conservation identified 24,082 acres of irrigated land on the Tongue River below Hanging Woman Creek. The same study identified at a reconnaisance level an additional 154,419 acres of potentially irrigable land along the Tongue River below Hanging Woman Creek. See Exhibit 2,attached hereto and incorporated herein. Water users with contracts for Tongue River water number 77, nearly all of them irrigators (Arnie Vinnard, Chief of Water Planning Division, Montana Department of Natural Resources and Conservation, November 21, 1980). One of these users is the Tongue and Yellowstone Irrigation District (T & Y Ditch) with a diversion dam on the Tongue River about twelve miles south of Miles City. T & Y Ditch supplies the needs of approximately 90 irrigator users with an appropriation of approximately 9,000 acre feet per year (Boyd Blum, Director on Board of Tongue and Yellowstone Irrigation District, November 23, 1980). Thus, approximately 167 farm and/or ranch units rely on Tongue River water below Tongue River Dam.

4. An unsuitability designation is sought for those lands in portions of the following townships in Rosebud and Powder River Counties, Montana, as measured from the Montana principal Meridian (M.P.M.).

Petitioners do not seek designation for those lands which lie within the boundaries of the Northern Cheyenne Indian Reservation, or where surface coal mining operations are currently prohibited, (ie. Custer National Forest). This petition is also not directed to any existing coal mine as presently permitted. See map of petition area attached hereto and by this reference incoporated herein as Exhibit 3. */

T 1.N., R 44.E., M.P.M., except sections 1 through 24;

T 1.S., R 44.E., M.P.M.;

T 1.S., R 45.E., M.P.M.;

T 2.S., R 44.E., M.P.M., except sections 16 through 20, 28 through 33, and those portions of sections 8,9,10,15,21,22, 27,34, and 35 lying within the boundaries of the Northern Cheyenne Indian Reservation;

T 2.S., R 45.E., M.P.M. except sections 1 through 3, 8 through 17, 23,24,27, 33 through 35, and those portions of sections 4, 20 through 22, 25, 26, 28, 29, and 36 lying within the boundaries of the Custer National Forest;

T 3.S., R 44.E., M.P.M., except sections 4 through 8, 16 through 20, 30 and 31, and those portions of sections 2, 3, 9, 10, 15, 21, 22, 28, 29, 32, and 33 lying within the boundaries of the Northern Cheyenne Reservation;

T 3.S., R 45.E., M.P.M., except sections 2 and 10, and those portions of sections 4, 12, 14, and 24 lying within the boundaries of the Custer National Forest;

T 4.S., R 43.E., M.P.M., except sections 1 through 12, 14 through 22, 28 through 32, and those portions of sections 23, 24, 26, 27, and 33 through 35 lying within the boundaries of the Northern Cheyenne Reservation;

T $.S., R 44.E., M.P.M., except sections 6, 10 through 14, 23 through 28, and 33 through 36, and those portions of sections 5, 7, 8, and 18 lying within the boundaries of the Northern Cheyenne Reservation, and sections 15, 21, and 22 lying within the boundaries of the Custer National Forest;

T 4.S., R 45.E., M.P.M., except sections 19, 30 through 32, and those portions of section 29 lying within the boundaries of the Custer National Forest;

T 5.S., R 42.E., M.P.M., except sections 1 through 16, and those portions of sections 17, 18, 20 through 26 lying within the boundaries of the Northern Cheyenne Reservation.

T 5.S., R 43.E., M.P.M., except sections 5, 6, 11 through 15, 21 through 28, 32 through 36, and those portions of sections 4, 7, 8, 9, 17, 18, and 19, lying within the boundaries of the Northern Cheyenne Reservation;

T 5.S., R 44.E., M.P.M., only those portions of sections 4, 5, 8, 9, 10, 16, 21, 22, 27, 33, 34, and 35 of which the surface is privately owned;

T 5.S., R 45.E., M.P.M., except sections 5 through 8, 17 through 21, 28 through 33, and those portions of sections 14, 22, 23, 27, and 34 lying within the boundaries of the Custer National Forest;

T 6.S., R 42.E., M.P.M.;

T 6.S., R 43.E., M.P.M.; except sections 1 through 4, 9 through 14, 24, 27, and 34 through 36, and those portions of sections 15, 22, 23, 25, and 26 lying within the boundaries of the Custer National Forest.

*/ Should any question or conflict arise with respect to whether certain lands should be included within the petition area, such question or conflict is to be resolved by the inclusion of the particular lands within the petition area, provided however, that those lands do not lie within the boundaries of the Northern Cheyenne Indian Reservation, or where surface coal mining is currently prohibited, or where there is an existing coal mine as presently permitted.

IDENTIFICATION AND INTEREST OF PETITIONERS

5. Northern Plains Resource Council is a non-profit Montana organization with its principal office at 419 Stapleton Building, Billings, Montana. Since its inception in 1972, NPRC has worked on behalf of its agricultural members whose livelihoods are threatened by mining and related industrialization. NPRC has members who reside and conduct business in and around the petition area who would be adversely affected and injured by strip mining and related industrialization in the affected and adjacent area. Members of NPRC irrigate, own irrigable lands, or hold water rights in the petition area. See affidavit of Helen Waller, NPRC chairman, attached hereto and by this reference incorporated herein as Exhibit 4.

6. Tongue River Agriculture Protection Association is an affiliate of NPRC. TRAPA's members reside and farm and ranch along or near the Tongue River between Ashland and Miles City. The purpose of TRAPA is to protect agriculture in recognition that poorly planned and unwise coal development would have an adverse effect on agriculture. Members of TRAPA irrigate, own irrigable lands, or hold water rights in the petition area. TRAPA members would be adversely affected and injured by strip mining and related industrialization in and around the petition area. See affidavit of Gary Ochsner, TRAPA president, attached hereto and by this reference incorporated herein as Exhibit 5.

7. Tri-County Ranchers Association is an affiliate organization of NPRC whose members reside and farm and ranch in and around the communities of Birney and Ashland, Montana. Members of TCRA irrigate, own irrigable lands, or hold water rights in the petition area. TCRA members would be adversely affected and injured by strip mining and related industrialization in and around the petition area. See affidavit of Mary Daniels, TCRA president, attached hereto and by this reference incorporated herein as Exhibit 6.

8. Rosebud Protective Association is an affiliate organization of NPRC. RPA's members reside and farm and ranch in the Colstrip area. Members of RPA irrigate, own irrigable lands, or hold water rights in the petition area. RPA members would be adversely affected and injured by strip mining and related industrialization in and around the petition area. See affidavit of Nick Golder, RPA president, attached hereto and by this reference incorporated herein as Exhibit 7.

9. Members of the petitioning organizations are engaged in the business of agriculture along the Tongue River and its tributaries. Many of them rely on Tongue River water for irrigation and other agricultural activities. Many also rely on subsurface waters adjacent to the Tongue River including the alluvium and Tongue River member aquifers for agricultural and domestic use. These individuals would be adversely affected by the decline in the quality of surface and groundwater in the petition area and adjacent and downstream areas which would result from surface mining in the petition area. See Exhibits 4,5,6,7; and the affidavit of Tom Bateridge, attached hereto and by this reference incorporated herein as Exhibit 8.

10. Members of the petitioning organizations would also be adversely affected by erosion and increased sediment load in streams which would result from inability to reclaim surface mined lands in the petition area. See Exhibits 4,5,6,7,8; and the affidavits of Richard H. Opper, attached hereto and by this reference incorporated herein as Exhibits 9 and 9a.

THE PETITION AREA COULD NOT BE RECLAIMED IN ACCORDANCE WITH THE REQUIREMENTS OF STATE AND FEDERAL LAW AFTER SURFACE COAL MINING OPERATIONS.

11. An area must be designated as unsuitable for surface coal mining if reclamation in accordance with the requirements of the law "is not technologically and economically feasible." 30 U.S.C. §1272(a)(2); 30 C.F.R. §762.11(a); 30 C.F.R. Parts 764 and 769; §82-4-228(2)(a) MCA; ARM 26.4.1141 through 26.4.1148. Montana law requires that disturbed lands be revegetated by establishing (§82-4-253(1) MCA):

> "a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area of land to be affected and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area except that introduced species may be used in the revegetation process where desirable and necessary to achieve the approved postmining land use plan. The vegetative cover must be capable of:
>
> * * *
>
> (b) regenerating under the natural conditions prevailing at the site, including occasional drought, heavy snowfalls, and strong winds; and
> (c) preventing soil erosion to the extent achieved prior to operation."

12. Reclamation of the area is not technologically or economically feasible because of a combination of sodic and/ or salty soils and shallow recoverable topsoils. See Opper affidavits, Exhibits 9 and 9a.

13. The physical and chemical characteristics of soils and overburden in the petition area are inadequate for revegetation. Avialable data indicates that salt and sodium problems are widespread throughout the petition area. Opper affidavits, Exh. 9, ¶¶ 12, 13, 14, 16; and Exh. 9a, ¶¶ 10, 16, 17. Salt and sodium levels at some sites in the petition area are extraordinarily high. Opper affidavits, Exh. 9, ¶ 19; Exh. 9a, ¶¶ 8, 9, 12, 14, 15. The data indicates further that well over 50% of the soils concerned are potentially too shallow for recovery. Opper affidavits, Exh. 9, ¶ 15, Exh. 9a, ¶ 18. Additionally, soils in the area appear to be dominated by smectite clays, which are highly sensitive to exchangeable sodium, thereby aggravating the adverse effects of as already serious sodium problem. Opper affidavits, Exh. 9, ¶¶ 10, 17.

14. Soluble salts inhibit plant growth and can prevent successful reclamation from being achieved. Opper affidavits, Exh. 9, ¶ 5.

15. High exchangeable sodium concentrations in the soil and overburden would have adverse effects on both plant growth and soil structure. Poor soil structure results in low infiltration,low root penetration, poor gas exchange, and accelerated erosion. Opper affidavits, Exh. 9, ¶¶ 5, 6, 8.

16. Mining activities would release salts from overburden strata and would further add to the saline and/or sodic conditions of the area. Additionally, upward migration of salts and sodium would be exacerbated by the activities of mining. Opper affidavits, Exh. 9, ¶ 10.

17. Climatic characteristics of the area would further impede successful revegetation. Under the semi-arid (14 inches annual rainfall) conditions in the petition area, migration of salts and sodium would tend to be in an upward direction resulting in high concentrations of these materials in the root zone and on the soil surface. Opper affidavit, Exh. 9, ¶5.

18. The shortage of salt-free topsoil available to bury sodic/saline material presents a technological obstacle to successful reclamation. Even with sufficient suitable materials for burying sodic spoils, the necessity of hauling water, adding soil amendments and providing drainage to counter the sodium problems would be economically prohibitive. Opper affidavit, Exh. 9, ¶¶11,15,19.

19. The effects of salt translocation often take decades to manifest themselves. Evidence indicates that burial of salty or sodic material by relatively non-saline topsoil may only postpone consequences. Opper affidavit, Exh. 9, ¶11. Surface mining and reclamation technology in the Northern Great Plains is too recently developed to lend the long term perspective necessary to assess the effects of burying sodic materials.

20. The combination of poor soil structure and the lack of vegetative cover which would result if reclamation fails would increase the susceptibility of soils to wind and water erosion. Opper affidavit, Exh. 9, ¶8.

SURFACE COAL MINING IN THE PETITION AREA COULD RESULT IN A SUBSTANTIAL LOSS OR REDUCTION OF LONG RANGE PRODUCTIVITY OF RENEWABLE RESOURCE LANDS, INCLUDING WATER SUPPLY AND FOOD PRODUCTS.

21. The Tongue River generally has the best overall water quality among streams in the coal region of southeastern Montana. Bateridge affidavit, Exh. 8, ¶5.

22. The area addressed by the petition is one of particular significance in the recharge, transmission and discharge of groundwater into the Tongue River. Bateridge affidavit, Exh. 8, ¶9.

23. Surface water from the Tongue River irrigates 24,082 acres below the mouth of Hanging Woman Creek. Additional irrigable land has been identified along the Tongue River. See Exhibit 2.

24. Residences, farms, and ranches, and the community of Ashland derive water from the Tongue River alluvium for domestic and agricultural use. Bateridge affidavit, Exh. 8, ¶7.

25. The Tongue River member aquifers in the petition area are used by farms and ranches, which depend on it for survival. The groundwater in these aquifers is often barely adequate, both qualitatively and quantitatively, for domestic and agricultural uses. See Bateridge affidavit, Exh. 8, ¶7.

26. Large scale mining in the petition area would cause significant regional changes. Most of the shallow groundwater in mined areas, plus part of the downstream regions, would be of marginal use for stock and undesirable for other uses. See Bateridge affidavit, Exh.8, ¶12. Deterioration of marginal aquifers and degradation of water in the Tongue River alluvium

would destroy the agricultural productivity of the affected areas.

27. Large scale mining in the area addressed by the petition would have a deleterious effect on the quality of Tongue River water. Bateridge affidavit, Exh.8, ¶¶10,12.

28. The effects on Tongue River water quality from large scale mining in the petition area would appear gradually over a period of years and become observable only after it is too late to remedy the damage or cause. Water quality degradation from surface mining along the Tongue River would continue for hundreds of years, long after the mines cease production. See Bateridge affidavit, Exh.8, ¶13.

29. Reduced streamflows in the Tongue River which would result from climatic conditions and increased withdrawals upstream for irrigation, municipal, or industrial uses would accelerate the decline in water quality. See Bateridge affidavit, Exh.8, ¶16.

30. The State of Montana is considering several alternatives for repairing the Tongue River Dam which would entail lowering the firm annual water supply for several years. Should this occur, reduced streamflows would aggravate the degradation of water quality in the Tongue River. See Bateridge affidavit, Exh.8, ¶¶14,16.

31. Strip mining operations are currently taking place in the Tongue River basin upstream from the petition area at the following mines in Montana and Wyoming: Decker East, Decker West, Spring Creek, Big Horn, Ash Creek, and Welch.

32. Additional mines are proposed or expected in the Tongue River basin upstream from the petition area. These include North Decker, Consol CX Ranch, PKS CX Ranch, Shell Young's Creek, and Amoco, with a total anticipated annual production capacity of 32.4 million tons per year by 1990. See "Montana Projected Annual Coal Production Capacity," attached hereto and by this reference incorporated herein as Exhibit 10.

33. Mines upstream from the petition area, both ongoing and likely additional operations, would compound the deleterious effects on the Tongue River from mining in the petition area. See Bateridge affidavit, Exh.8, ¶16.

34. If reclamation attempts fail in the petition area, increased sediment loads might result which would further degrade water quality in the Tongue River. See Bateridge affidavit, Exh.8, ¶15. See also Opper affidavit, Exhibit 9.

35. The intense pressures on the Tongue River upstream from the petition area and the significance of the petition area as a source of recharge, transmission and discharge of groundwater accentuate the critical importance of preserving the area from the disuptive effects of surface mining.

Incorporating Previously Submitted Materials

Incorporated in this Petition, are the initially submitted petition with exhibits, as well as all other material submitted with regard to that petition.

CONCLUSION

WHEREFORE, petitioners request that the affected areas be designated as unsuitable for surface coal mining operations.

Helen Waller (JAP)

Helen Waller, Chairman

Northern Plains Resource Council
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JAPatten

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Dated: December 26, 1980

EXHIBIT 1

DEPARTMENT OF AGRICULTURE

CAPITOL STATION, HELENA, MT 59601
(406) 449-3124

THOMAS L. JUDGE, GOVERNOR
W. GORDON McOMBER, DIRECTOR

RECEIVED
MAR 10 1980

For your information I herewith enclose a paper prepared by Wesco Resources, Inc. showing proposed coal development that it has commenced; explaining the shortline railroad that the coal companys named, intend to build from Miles City south to Birney, Montana; and showing projected coal movements by rail east and west from Miles City, Montana proposing to utilize the Milwaukee Trustees Mil II lines for eastward movement, and State of Montana's Railroad lines for western coal movement.

Sincerely,

Raymond W. Brault

Raymond W. Brault, Department Attorney

RWB/khj

Enclosure

industry interests, and transfer the acquired properties to it. The State, or the non-profit corporation, if it is in existence (hereafter called the "State railroad"), will seek some $59 million in section 505 and 803 F.R.A. funds and state bond money to rehabilitate the line to Class III standards (45 miles per hour speed), and will look for an operator to lease and subsequently purchase the property. The State is also seeking some $16 million in equity funds from various industries for use as working capital for the State railroad.

2. The Railroad System in the Region

At the present time, rail service in the area (i.e., from Miles City to Marengo) is provided by two railroads, the Burlington Northern and the Milwaukee. The Burlington Northern operates two east-west main lines in Montana, the northern being the former Great Northern Railway and the southern the former Northern Pacific. Both lines intersect at Spokane, Washington, with the former Northern Pacific line then proceeding in a southwesterly direction to Marengo, where it connects with the Milwaukee's main east-west line and the Union Pacific's line to Spokane. In Montana, the Milwaukee nearly parallels, and is competitive with BN's southern mainline for substantial distances over its own line from Miles City west to the Idaho border. The Milwaukee also has trackage rights to Billings over the BN. With the exception of its rights into Billings, the Milwaukee's Trustee is seeking authority from its Reorganization Court to abandon all lines west of Miles City to the terminus of its line at Seattle. Should such occur, the Burlington Northern would have control, for all practical purposes, of rail service in Montana and portions of Idaho and Washington.

3. General Considerations

The proposal outlined above, whether as a fall-back to the Milwaukee employee stock option proposal or on its own merits, might prove to be a realistic and cost-saving approach to the retention of competitive rail service in this area. However, it requires a stronger economic base if it is to be truly successful. Greater opportunity for success would be presented if there were large volumes of coal traffic moving in assured, contracted amounts to utilities in the Pacific Northwest. (In addition, such coal traffic could aid in the success of the surviving Milwaukee core system eastbound to Minnesota and Wisconsin.) With such traffic, the State railroad could well serve as an outstanding example of what can be done if State and local governments, labor, and other interests are promptly brought together in a mutually supportive effort to preserve and enhance competitive rail service.

4. The Role of Coal Transportation

As indicated, increasing the volume of rail-transported coal in the area could well prove to be the key element.

Such coal transportation prospects do, in fact, exist in the Tongue River area of southeastern Montana near Ashland. (See map marked Exhibit "A".) There, in the northern Powder River area, Thermal Energy Inc., a subsidiary of Washington Energy Company, Seattle, Washington, and its partners acquired a contiguous economic unit of 300 million tons of high B.T.U.-content, low sulfur coal. Other companies (i.e. Peabody Coal Co., Cities Service Oil Co., Consolidation Coal Co., Carter and AMAX) have similar economic coal resources in the Ashland area. Rail transportation into this area could open up substantial economic, low sulfur, high B.T.U. coal tonnages which would be an equivalent of approximately 30 billion barrels of oil. Other midwestern, as well as Pacific Northwest utilities have expressed a strong interest in receiving long-term coal supplies from this area.

The CRITICAL problem is how to get this valuable and needed coal to its destination. Overtures by Wesco and Thermal Energy have been made to the Burlington Northern over a four-year period, during which Wesco and Thermal Energy set forth the merits of the project and offered to discuss possible financing alternatives. However, the Burlington Northern has been, and is today, unwilling to build the 85-mile line of railroad from Birney to Miles City or the 45-mile line from Birney to Colstrip which is needed to develop this resource. The cost for the Miles City segment would be approximately

$120 million. If the additional 45-mile line were to be built from Birney to Colstrip, Montana, an overall total of $150 million would be required. As a result of the BN's posture, Wesco and Thermal Energy have reluctantly concluded that they must move ahead on their own, form a new railroad company, acquire right-of-way, and build their Tongue River Railroad ("T R Railroad"). At Miles City, the coal traffic could then move eastbound over the BN and/or a restructured Milwaukee core, as proposed by the Trustee, or over the Milwaukee ESOP lines, and westbound, over either the new State railroad connecting with the Union Pacific at Marengo, the ESOP lines, or the BN, to various points in Montana, Idaho, Washington, and Oregon. Thus, BN, which has virtual control over coal transportation in the Northern Tier States, would be faced with meaningful competition with substantial benefits flowing to the region.

Thermal Energy's and its partners' analyses indicate that the railroad project would clearly be viewed as of a venture capital nature. It will need partial federal support only, in the form of section 511 guaranteed loans; it seeks no federal cash grants or loans. Thermal Energy and its partners are fully prepared to seek such guarantees to attract equity capital and to assume substantial debt. Thermal Energy and its partners would prefer not to get into the railroad business but the BN's position leaves it no choice. Thermal Energy and its partners must plan now to bring their competitive coal to market.

5. Coal Market Requirements

The coal potential in the new producing area near the Tongue River in Montana is one of significant national importance. The coal quality is higher than existing nearby operations that would serve the same markets. Favorable mining and reclamation conditions make coal from this area an attractive option. At a minimum, it would appear that about 30 million tons of new coal production could be expected from this area by 1990. Besides the coal of Thermal Energy and its partners, other companies, including Peabody Coal Co., Consolidation Coal Co., and Cities Service Oil Co., have large contiguous blocks of mineable reserves. Thermal Energy and its partners forecast a mine with 12 million tons annual capacity. Additional mines of 10 million tons of annual capacity could be accommodated in that area and would provide attractive economics at that size in meeting other competitive influences. Rail transportation to the area is the key.

The market has been investigated at some length during the past year. It was apparent from the outset that one probable competitive market area for this coal would be in the Upper Midwest. The rail mileages to that area together with the quality and preliminary mine prices, compared to other available coals, pointed in that direction and were also confirmed by information available in published reports.

The market studies confirm that a major area of interest would be the electric utilities in Minnesota, Wisconsin, and Michigan. In addition, the studies indicate the emergence of major coal markets in the Pacific Northwest. Discussions have been held with the sponsors of a coal fired generation plant to be located in Creston, Washington, west of Spokane, and with sponsors of other potential projects in the region.

The comparative delivered prices are shown on Exhibit "B". While the northeast markets of Minnesota, Wisconsin, and Michigan are of prime importance, the Pacific northwest and southeast (Nebr., Kansas, Iowa) areas are also significant and are shown for comparison. The purpose of this tabulation is to show indicative costs and the general competitive position of this coal. The mine prices were adjusted for differences in boiler efficiency, boiler size to accommodate high sodium levels, and degree of gas scrubbing required. Rail rates were based strictly on mileages from the different mines shown using a rate of 1.135 cents per ton mile including rail cars. This seems to be the same general level at which most of the utilities are forecasting new rail rates. The comparison shows that this coal is most competitive in the Upper Midwest, followed by the northwest markets, and lastly the southeast.

The delivered cost comparisons have not included the Big Sky, Colstrip, or Spring Creek mines. It is assumed that all tonnage is committed to Minnesota Power & Light from the existing Big Sky mine, that Colstrip Rosebud coal will be dedicated to Units 3 & 4, and that Spring Creek coal will closely follow the Decker mine price pattern now that its initial production is committed.

Specific new coal tonnage required by the utilities in the three state area is somewhat difficult to define precisely. There are many factors changing constantly. New generation planning is affected by joint ownership opportunities, uncertain environmental regulations, delays, etc. However, as a guide, the overall energy increase forecasted by the Edison Electric Institute in September 1978 indicates the following:

Year	New Fuel Needs Coal Equivalent*
1987	45 million tons
1990	62 million tons
1995	95 million tons

*(Annually on an accumulated basis)

This increase averages 3.9% over the 1978 to 1995 period which is somewhat less than that estimated by the National Electric Reliability Council. The increase in total tonnage compares well with the Keystone Coal Publication figures derived from the utilities themselves which shows a 33 million ton increase from 1978 to 1985 in the 3 states. The total increase of 45 million tons by 1987 agrees well with earlier projections determined by Thermal Energy and its partners after allowing for announced nuclear additions and previously committed coal. As much as 20 - 25 million tons annually may be absorbed by announced nuclear additions and previously committed coal leaving 20 - 25 million tons available to this project. This tonnage would require rail delivery in the Cohasset, Duluth-Superior, Twin Cities areas of Minnesota and the Madison, Green Bay, and LaCrosse areas of Wisconsin.

As indicated by earlier market reports, utility plans are constantly changing. One of the "moving targets" will become fixed shortly when the various states publish their State Implementation Plans for meeting federal air quality regulations. These plans will probably be known within the next three months and may open the door for additional western tonnage. For example, Union Electric Company of St. Louis, Missouri has recently announced cancellation of previously contracted Illinois coal and purchased 8 million tons from Southern Wyoming. In another case, Detroit Edison, as previously reported, is preparing a compliance plan for their Monroe Station where this coal is of interest as a blending possibility. Both of these changes came as a result of their states implementation plan and require replacement coal to comply. New requirements, such as these, are over and above those shown in the growth tabulation and bear watching as the compliance plans unfold.

In summary, Thermal Energy and its partners are convinced there is adequate production potential to support a rail extension to the Tongue River Area and that a sizeable market area can be reached on a competitively attractive basis in the Upper Midwest and the Pacific Northwest.

6. Proposed Course of Action

In the circumstances, it would appear appropriate for the following steps to be taken:

(1) Ensure that any Federal funding assistance for the State railroad clearly envision that section 511 loan guarantee funding will also be available for new railroad construction and development which, while physically separate and apart from the State railroad, will connect and economically relate to it. The Powerplant and Industrial Fuel Use Act of 1979, P.L. 95-620, section 803, 45 U.S.C. §822, 825, is a precedent for coal railroad funding with DOT/FRA funds.

(2) Ensure that section 511 loan guarantees for the new construction and development of the T R Railroad are available and will continue to be available, whether or not the State railroad proposal moves ahead.

The key is the involvement of Thermal Energy and its partners as a shipper and/or as a railroad and the possible participation of other connecting carriers. These factors will:

(a) help the State railroad, the ESOP railroad, and/or the remaining Milwaukee Railroad core system to succeed;

(b) help substantially to relieve the Nation's energy crisis;

(c) preserve competitive rail service in the Northern Tier States; and

(d) demonstrate creative economic and political action by those supporting the proposal.

EXHIBIT 2

OLD WEST REGIONAL COMMISSION

ANNUAL REPORT

June 25, 1974 to June 30, 1975
Project Number 10470022

A Study to Evaluate Potential Physical, Biological, and Water Use Impacts of Water Withdrawals and Water Development on the Middle and Lower Portions of the Yellowstone River Drainage in Montana

Submitted by

Gary J. Wicks, Director
Montana Department of Natural Resources
and Conservation
32 S. Ewing
Helena, Montana 59601

To

Dr. Kenneth Blackburn
Project Coordinator
Old West Regional Commission
Room 306A Fratt Building
Billings, Montana 59102

August 1, 1975

TASK 4. ASSESSMENT OF THE IMPACT OF ALTERED STREAM FLOWS ON AGRICULTURE WHICH IS DEPENDENT UPON IRRIGATION. The Grantee shall estimate the future demand for agricultural projects provided by irrigated farming. The Grantee shall project what further irrigation development could occur in the study area on the basis of the existing resource base. The Grantee shall ascertain and, insofar as possible, quantify potential physical and economic constraints that may result from the use of water for coal development.

IRRIGABLE LANDS ANALYSIS

Philip Threlkeld, with the help of Glenn Smith, Elna Tannehill, and Mike Brown, all of DNRC, worked on this task.

The DNRC general reconnaissance land classification system was used to identify and locate the irrigable lands in the Yellowstone Basin. This system evaluates the land's ability to sustain irrigated agriculture and classifies the land according to its productive value:

1. Irrigable land
    - a. High productive value (Class 1)
    - b. Intermediate productive value (Class 2)
    - c. Low productive value (Class 3)
2. Nonirrigable land (Class 6)

The term "irrigable land" as used in this classification includes land that is appropriate for irrigation by either gravity or sprinkler methods. The classification is based on similarity of characteristics such as soils, topography, and climate, and disregards both the present available water supply and economic constraints to irrigation.

Based on this system, there are over 2.2 million acres of irrigable land in the Yellowstone Basin. However, much of this land does not have an adequate water supply, and because both technical and economic constraints limit irrigation to areas within reach of an adequate water supply, these constraints must be considered when estimating future irrigation.

A preliminary tabulation was made incorporating technical limitations. These constraints were arbitrarily set, and can be modified as more accurate information becomes available. Their primary purpose was to limit the size of the area to be studied. The technical limitations used for the preliminary tabulation are:

1. All water comes from the Yellowstone River, or its major tributaries:

a. Powder River
b. Tongue River
c. Bighorn and Little Bighorn Rivers
d. Clarks Fork of the Yellowstone

2. Maximum pipeline length is 15 miles

3. Maximum pump lift is 700 ft/pump

Table 41 summarizes the preliminary tabulation. The irrigable land was classified into "phases" according to pipeline length and pump lift.

Phase I includes all land within 1 mile of the river or an existing irrigation structure. This land is generally situated along the floodplain and is intermingled with presently irrigated land. Expansion of the present facilities or construction of short pipelines could bring an additional 247,659 acres under irrigation.

Phase II includes all land within 5 miles of the river requiring a vertical lift of no more than 700 feet. Most of this land occurs on the benches above the river. Sprinkler irrigation is currently being used on some of these benches, with pump lifts of up to 450 ft. (Montana DNRC 1975). 356,537 additional acres can be irrigated on these benches. However, more complete technical and economic information is needed to determine the amount of irrigation that is likely to be developed.

Phase III includes land that is more than 5 miles from a water supply, requires more than one pumping station (700 ft. lift/pump), or requires a siphon to cross gullies. Many of these areas are located along small tributary streams and are intermixed with presently irrigated land. The potential for expansion is limited unless supplemental water is obtained from the Yellowstone River or its major tributaries. Complete economic and technical analysis is needed to determine the feasibility of irrigating Phase III land. An additional 192,849 acres can be irrigated if these areas are feasible.

A computer program has been developed by Mike Brown to help evaluate the technical and economic limitations of water delivery systems. This program is designed to compute the cost of pumping water to a highline ditch for each irrigation project. Construction costs for a highline ditch will then be added to the pumping costs to determine the total price of water delivered to the farm gate for each project.

Farm budgets will be used to determine the price farmers can pay for water under various commodity price conditions, cropping patterns, and irrigation systems. The U.S. Bureau of Reclamation has developed farm budgets for the entire Yellowstone Basin. These budgets are being used as guidelines for developing a version that is compatible with the computer program and which provides the necessary information for comparing water delivery costs to the farmers' ability to pay for water.

CROSS-SECTION SURVEY

In order to evaluate the effects of changes in streamflow on diversions in the Yellowstone River Basin, several sites have been chosen where cross sections of the rivers will be surveyed. These are:

TABLE 41. Irrigable land in the Yellowstone Basin, by county (in acres)

County	Phase			Pump Lift (feet)							Total
	I	II	III	0-100	100-200	200-300	300-400	400-500	500-600	600 +	
Big Horn	15,915	79,474	28,556	17,111	14,991	19,390	24,522	16,079	16,799	15,053	123,945
Carbon	19,617	11,712	7,873	19,617	0	624	832	7,953	10,176	0	39,202
Custer	43,007	16,683	0	43,007	0	4,660	5,881	6,142	0	0	59,690
Dawson	10,228	32,976	28,644	10,228	1,870	0	2,729	34,252	19,936	2,833	71,848
Park	28,610	14,132	3,012	28,610	906	4,856	716	2,107	1,097	7,462	45,754
Powder River	41,127	25,654	26,767	46,184	3,144	4,731	5,977	30,974	2,538	0	93,548
Prairie	6,565	34,092	3,088	6,565	1,429	8,306	11,584	15,861	0	0	43,745
Richland	7,836	15,718	41,093	8,706	2,792	5,431	7,049	23,511	17,158	0	64,647
Rosebud	17,973	36,675	15,642	21,888	1,825	1,054	8,357	19,451	4,103	13,612	70,290
Stillwater	13,317	2,681	0	13,744	2,254	0	0	0	0	0	15,998
Sweetgrass	13,570	8,867	1,448	13,570	0	346	0	0	7,010	2,959	23,885
Treasure	11,886	18,749	11,170	11,886	4,379	2,857	15,964	6,719	0	0	41,805
Wibaux	368	0	0	368	0	0	0	0	0	0	368
Yellowstone	17,640	59,124	25,556	17,640	4,424	14,884	13,939	9,942	17,264	24,227	102,320
TOTAL	247,659	356,537	192,849	259,124	38,014	67,139	97,550	172,991	96,081	66,146	797,045
% of TOTAL	31	45	24	33	5	8	12	22	12	8	

1. Sidney Pumping Plants 1, 2, and 3.
2. Buffalo Rapids Project-Kinsey Ditch.
3. Glendive City Water Supply.
4. Billings City Water Supply and Coulsen Ditch.
5. Forsyth Diversion Dam.
6. Rancher Ditch.
7. Hugo Muggli Pump (Tongue River).
8. Victory Ditch (Bighorn River).
9. Bighorn Low Line Canal.

Several cross sections are taken at each site so that water surface profiles can be generated. To date, the field work has been completed on the Sidney, Kinsey, and Forsyth sites, and surveying of control points has been started on the Glendive and Hugo Muggli sites. Drafting is also complete on the Sidney sites. Along with the cross sections, books have been prepared for each agency involved in the study showing the sites of interest to each participant.

Task 4 is approximately 35% completed.

Work schedules for next quarter include:

1. Completion of farm budgets.
2. Determination of highline ditch requirements for each project.
3. Continuation of cross-section surveys.

Jan 75

YELLOWSTONE DRAINAGE BASIN

UPPER YELLOWSTONE

	Class 1	Class 2	Class 3	Class 3C	Total Irrigable	Total Irrigated	Class 6	Total Acres
- Shields River								
Gallatin		303	3,671	159	4,133	4,130	83,150	91,413
Meagher			121		121	25	23,040	23,186
Park		24,553	21,909		46,462	30,898	345,170	422,530
	-0-	24,856	25,701	159	50,716	35,053	451,360	537,129
- Yellowstone River (above and including Bridger Creek)								
Gallatin				47	47	90	37,000	37,137
Park		3,729	46,809	9	50,547	32,962	910,960	994,469
Stillwater							18	18
Sweet Grass		26,798	28,339		55,137	30,581	412,944	498,662
	-0-	30,527	75,148	56	105,731	63,633	1,360,922	1,530,286
- Boulder River								
Park		25	1,215		1,240	77	153,577	154,894
Sweet Grass		3,357	3,419		6,776	8,640	158,290	173,706
	-0-	3,382	4,634	-0-	8,016	8,717	311,867	328,600
V - Sweet Grass Creek								
Park							16,185	16,185
Stillwater							1,339	1,339
Sweet Grass		4,681	17,848		22,529	15,893	182,762	221,184
	-0-	4,681	17,848	-0-	22,529	15,893	200,286	238,708
- Stillwater River								
Carbon			2,089		2,089	3,857	95,346	101,292
Park							35,493	35,493
Stillwater		270	9,348		9,618	22,462	415,173	447,253
Sweet Grass			187		187		93,163	93,350
	-0-	270	11,624	-0-	11,894	26,319	639,175	677,388
- Clarks Fork Yellowstone River								
Big Horn							4,343	4,343
Carbon	500	15,980	28,894		45,374	89,650	777,826	912,850
Park							45,096	45,096
Yellowstone		6,489	4,219		10,708	1,026	29,874	41,608
	500	22,469	33,113	-0-	56,082	90,676	857,139	1,003,897
- Yellowstone River (from Bridger Creek to the Clarks Fork Yellowstone)								
Big Horn							128	128
Carbon	12	1,661	964		2,637	810	42,181	45,623
Stillwater	73	2,244	6,563		8,880	12,218	318,931	340,029
Sweet Grass		442	2,246		2,688	472	60,308	63,468
Yellowstone	521	2,942	510		3,973	8,104	9,683	21,760
	606	7,289	10,283	-0-	18,178	21,604	431,231	471,013
btotal	1,106	93,474	178,351	215	273,146	261,895	4,251,980	4,737,021

J - Yellowstone River (between the Big Horn River and the Tongue River)								
Big Horn	249	11,500	2,641		14,390		104,829	119,219
Custer		2,969	5,421		8,390	1,298	138,526	148,214
Garfield						80	105,868	105,948
Musselshell		36	14		50		17,174	17,224
Rosebud	2,117	58,184	18,120		78,421	21,805	1,539,254	1,639,480
Treasure	7,173	41,071	23,836		72,080	20,859	452,833	545,772
Yellowstone	276	4,321	966		5,563		66,500	72,063
	9,815	118,081	50,998	-0-	178,894	44,042	2,424,984	2,64[illegible]20
total	56,174	535,444	309,814	-0-	901,432	235,205	9,266,021	10,402,964

LOWER YELLOWSTONE

	Class 1	Class 2	Class 3	Class 3C	Total Irrigable	Total Irrigated	Class 6	Total Acres
I - Little Powder River								
Carter	33	503	2,598		3,134	406	46,328	49,868
Powder River	6,279	50,062	21,344		77,685	6,377	281,154	365,216
	6,312	50,565	23,942	-0-	80,819	6,783	327,482	415,084
J - Powder River (below Clear Creek)								
Carter		65	3,279		3,344	152	298,074	301,570
Custer	398	11,365	30,106		41,869	11,546	779,073	832,488
Powder River	35,273	106,130	49,301		190,704	20,901	778,053	989,658
Prairie	147	4,541	2,138		6,826	82	56,971	63,879
	35,818	122,101	84,824	-0-	242,743	32,681	1,912,171	2,187,595
K - Yellowstone River (between the Tongue River and the Powder River)								
Custer	54	5,733	9,172		14,959	18,446	492,581	525,986
Prairie	773	716	4,171		5,660	2,498	60,779	68,937
Rosebud		4,661	3,709		8,370	203	287,130	295,703
	827	11,110	17,052	-0-	28,989	21,147	840,490	890,626
L - O'Fallon Creek								
Carter		431	5,199		5,630	1,627	162,221	169,478
Custer		1,909	4,965		6,874	81	111,515	118,470
Fallon		5,037	35,918		40,955	2,253	534,723	577,931
Prairie		2,741	6,584		9,325	881	139,528	149,734
	-0-	10,118	52,666	-0-	62,784	4,842	947,987	915,613
M - Yellowstone River (below the Powder River)								
Dawson	4,841	154,489	257,572		416,902	19,475	783,487	1,219,864
Fallon	123	224	7,097		7,444	180	90,055	97,679
McCone		174	324		498		4,783	5,281
Prairie	237	28,135	27,712		56,084	9,587	550,824	616,495
Richland	1,348	15,087	96,622		113,057	38,333	530,396	6[illegible]86
Wibaux	1,546	11,344	5,599		18,489	107	304,357	32[illegible],953
	8,095	209,453	394,926	-0-	612,474	67,682	2,263,902	2,944,058
btotal	51,052	403,347	573,410	-0-	1,027,809	133,135	4,028,130	4,508,918
and Total	108,332	1,032.265	1,061,575	215	2,202,387	630,235	17,546,131	19,698,903

MIDDLE YELLOWSTONE

	Class 1	Class 2	Class 3	Class 3C	Total Irrigable	Total Irrigated	Class 6	Total Acres
- Pryor Creek								
Big Horn		16,386	8,558		24,944	1,176	131,897	158,017
Carbon							207	207
Yellowstone	4,501	20,721	40,767		65,989	2,181	161,010	229,180
	4,501	37,107	49,325	-0-	90,933	3,357	293,114	387,404
- Shoshone River								
Big Horn		366	974		1,340	63	25,627	27,030
Carbon		2,375	11,834		14,209	1,584	106,074	121,867
	-0-	2,741	12,808	-0-	15,549	1,647	131,701	148,897
)- Little Big Horn River								
Big Horn	3,940	42,120	23,906		69,966	24,485	540,445	634,896
	3,940	42,120	23,906	-0-	69,966	24,485	540,445	634,896
- Big Horn River (below the Greybull River)								
Big Horn	5,303	78,064	67,698		151,065	43,964	1,155,640	1,350,669
Carbon			6,200		6,200	462	128,280	134,942
Treasure	4,345	5,040	1,039		10,424	372	66,695	77,491
Yellowstone	166	2,951	1,341		4,458	1,581	43,348	49,387
	9,814	86,055	76,278	-0-	172,147	46,379	1,393,963	1,612,489
- Yellowstone River (between the Clarks Fork Yellowstone and the Big Horn River)								
Big Horn	215	15,563	6,344		22,122	23	116,471	138,616
Musselshell			624		624	102	59,097	59,823
Stillwater	56	361	15		432	41	280,156	280,629
Sweet Grass		424	1,064		1,488		12,284	13,772
Yellowstone	4,427	98,994	38,014		141,435	83,919	1,008,214	1.233,568
	4,698	115,342	46,061	-0-	166,101	84,085	1,476,222	1,726,408
- Rosebud Creek								
Big Horn	42	6,432	8,284		14,758	550	313,984	329,292
Rosebud	126	14,165	4,246		18,537	1,257	480,323	500,117
	168	20,597	12,530	-0-	33,295	1,807	794,307	829,409
- Tongue River (above and including Hanging Woman Creek)								
Big Horn	799	7,618	2,619		11,036	3,463	397,208	411,707
Powder River		1,207	519		1,726		9,709	11,435
Rosebud	104	6,202	1,060		7,366	1,858	158,588	167,812
	903	15,027	4,198	-0-	20,128	5,321	565,505	590,954
: - Tongue River (below Hanging Woman Creek)								
Big Horn			55		55		16,550	16,605
Custer	1,663	8,600	5,917		16,180	10,873	682,011	709,370
Powder River	19,287	79,663	25,421		124,371	6,061	602,664	733,096
Rosebud	1,385	10,111	2,317		13,813	7,148	344,555	365,516
	22,335	98,374	33,710	-0-	154,419	24,082	1,645,780	1,824,587

EXHIBIT 3

PETITION AREA ------

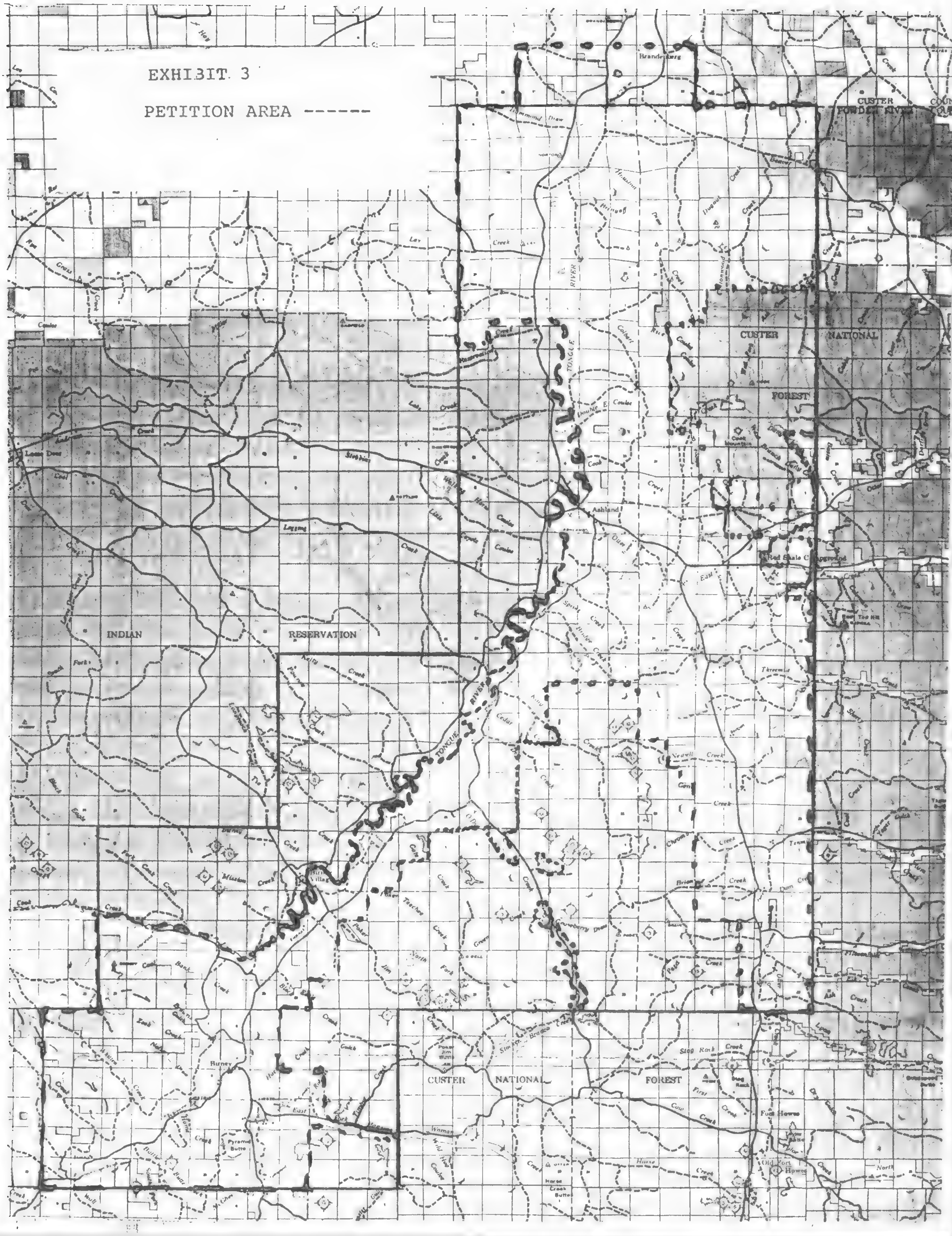

EXHIBIT 4

BEFORE THE: STATE OF MONTANA
DEPARTMENT OF STATE LANDS
AND

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING AND ENFORCEMENT

In the matter of

Designating certain lands
in Rosebud and Powder River
Counties, Montana, as
Unsuitable for Surface
Coal Mining Operations

Affidavit of Helen Waller, Chairman
Northern Plains Resource Council

County of McCone)
) ss:
State of Montana)

Helen Waller, being duly sworn, upon oath deposes and says:

1. I make this statement in support of the Petition to designate certain lands, in Rosebud and Powder River Counties, Montana, as unsuitable for surface coal mining operations. I am a farmer-rancher, and Chairman of the Board of the Northern Plains Resource Council.

2. The Northern Plains Resource Council is an agricultural group consisting of ranchers, farmers, and concerned citizens. We have worked since 1971 to promote and protect the agricultural interests of our members when their livelihoods are threatened by mining and related industrialization.

3. The Northern Plains Resource Council, in its' efforts to preserve the agricultural integrity of the Tongue River Basin, has joined with its' affiliate groups; the Tongue River Agricultural Protective Association, the Rosebud Protective Association, and the Tri-County Ranchers Association, in this petition to designate certain lands in Rosebud and Powder River Counties, Montana, as unsuitable for surface coal mining operations. The Northern Plains Resource Council has members who would

be directly affected by coal mining operations in the area sought for unsuitability designation, and also have personal knowledge of the allegations brought forth in this petition. Furthermore, The Northern Plains Resource Council has members who live in and/or own irrigable land, or hold water rights within the affected or adjacent area. (The term "affected area" is used in this affidavit to refer to the lands for which an unsuitability designation is sought. The term "adjacent area" refers to lands outside the affected area which would be harmed by surface coal mining operations. This usage is the same in all subsequent affidavits.)

Helen Waller *

Helen Waller, Chairman

Northern Plains Resource Council

Signed and sworn to before me, this 25th day of November, 1980.

Notary Public for the State of Montana

Residing at: Billings, Mont

My commission expires 9/1/81

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* Original on file with the Montana Department of State Land

EXHIBIT 5

BEFORE THE:

STATE OF MONTANA
DEPARTMENT OF STATE LANDS

AND

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING, RECLAMATION AND ENFORCEMENT

In the matter of)	
)	
Designating certain lands)	
in Rosebud and Powder River)	Affidavit of Gary Ochsner
Counties, Montana, as)	
Unsuitable for Surface)	President, Tongue River
Coal Mining Operations)	Agriculture Protection Associatior

County of Custer)
) ss:
State of Montana)

Gary Ochsner, being duly sworn, upon oath deposes and says:

1. I make this statement in support of the Petition to designate certain lands in Rosebud and Powder River Counties, Montana, as unsuitable for surface coal minig operations.

2. I am a rancher and irrigator in Custer County, Montana, and I am President of the Tongue River Agriculture Protection Association.

3. The Tongue River Agriculture Protection Association is an agricultural group whose membership consists mostly of farmers and ranchers who are dependent on the Tongue River for their livelihood. The members of ("TRAPA"), irrigate, own irrigable land, or hold water rights within the affected and adjacent area of the petition and will be adversely affected by, and have personal knowledge of the allegations brought forth in this petition.

4. As irrigators and ranchers in the Tongue River Basin,we are concerned that the cumulative impacts from proposed surface mining in the petition area will cause irreperable harm to the agricultural community in the Tongue River Basin. For these reasons we have joined in the Petition seeking an unsuitability designation for the affected area.

Gary Ochsner

Gary Ochsner
President, Tongue River
Agriculture Protection Association

Signed and sworn to befor me, this 25th day of November, 1980.

Notary Public for the
State of Montana
Residing at: Billings, Mont

My commission expires: 9/1/81

EXHIBIT 6

BEFORE THE:

STATE OF MONTANA
DEPARTMENT OF STATE LANDS

AND

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the matter of

Designating certain lands
in Rosebud and Powder River
Counties, Montana, as
Unsuitable for Surface
Coal Mining Operations

Affidavit of Mary Daniels

President, Tri-County Ranchers Association

County of Rosebud)
) ss:
State of Montana)

Mary Daniels, being duly sworn, upon oath deposes and says:

1. I make this statement in support of the Petition to designate certain lands in Rosebud and Powder River Counties, Montana, as unsuitable for surface coal mining operations.

2. I am a rancher in Rosebud County, and I am President of the Tri-County Ranchers Association. (T-CRA)

3. The Tri-County Ranchers Association is an agricultural group whose membership consists primarily of ranchers in Rosebud and Powder River Counties, Montana. Members of Tri-County Ranchers Association own irrigable land or hold water rights within the petition area. These members will be directly affected by, and have personal knowledge of the allegations brought forth in this petition.

4. As Ranchers, we are concerned with the cumulative effect that proposed large scale strip mining will have on the affected and adjacent areas discussed in the petition. Since it is our desire to protect the agricultural viability of the Tongue River Basin, we have joined in the Petition seeking an unsuitability designation for the affected area.

Mary Daniels
President, Tri-County Ranchers
Association

Signed and sworn to before me, this 24th day of November, 1980

Notary Public for the
State of Montana
Residing at:

My commission expires:
5-17-82

EXHIBIT 7

BEFORE THE: STATE OF MONTANA

DEPARTMENT OF STATE LANDS

U.S. DEPARTMENT OF THE INTERIOR

OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the matter of

Designating certain lands in Rosebud and Powder River Counties, Montana, as Unsuitable for Surface Coal Mining Operations	Affidavit of Nick Golder President, Rosebud Protective Association

County of Rosebud)
) ss:
State of Montana)

Nick Golder, being duly sworn, upon oath deposes and says:

1. I make this statement in support of the Petition to designate certain lands in Rosebud and Powder River Counties, Montana, as unsuitable for surface coal mining operations.

2. I am a rancher in Rosebud County, and I am President of the Rosebud Protective Association.

3. The Rosebud Protective Association is an agricultural group whose membership consists of ranchers in Rosebud County, Montana. Members of Rosebud Protective Association own irrigable land, irrigate, or hold water rights within the petition area. These members will be directly affected by, and have personal knowledge of the allegations brought forth in this petition.

4. As ranchers, we are concerned with the cumulative effect that propsed large scale strip mining will have on the affected and adjacent areas discussed in the Petition. Since it is our desire to protect the agricultural viability of the Tongue River Basin, we have joined in the Petition seeking an unsuitability designation for the affected area.

Nick Golder, President
Rosebud Protective Association

4. As ranchers, we are concerned with the cumulative effect that proposed large scale strip mining will have on the affected and adjacent areas discussed in the Petition. Since it is our desire to protect the agricultural viability of the Tongue River Basin, we have joined in the Petition seeking an unsuitability designation for the affected area.

Nick Golder, President
Rosebud Protective Association

Signed and sworn to before me, this ____day of November, 1980

Notary Public for the State of Montana
Residing at:

My commission expires:

EXHIBIT 8

STATE OF MONTANA

BEFORE THE DEPARTMENT OF STATE LANDS

U.S. DEPARTMENT OF THE INTERIOR

BEFORE THE OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the Matter of

Designating Certain
Lands in Rosebud and
Powder River Counties,
Montana, as Unsuitable
for Surface Coal Mining
Operations

AFFIDAVIT OF TOM BATERIDGE

County of Missoula)
)
State of Montana) ss:

TOM BATERIDGE, being first duly sworn upon oath, deposes and says:

1. I make this statement in support of the Petitioner's request that the portion of the Tongue River basin cited in this petition be designated unsuitable for surface coal mining operations.

2. I am a hydrologist and soil scientist with Geoservices West, Missoula, Montana. I have served as a consultant to the Committee on Soil and Groundwater Resources in relation to coal mining of the National Academy of Sciences, National Research Council. I have participated in many projects designed to determine the impact of land use practices on water and soil resources. I hold a Masters degree in Geology (Hydrology) from the University of Montana, a Masters degree in Soil Science from Montana State

University, and am a Ph.D. candidate in Geology at the University of Montana. My vita is attached as Appendix A.

3. Prior to preparing this statement, I reviewed numerous publications relating to the Geology and Hydrology of the Tongue River area. These are listed in Appendix B.

4. Many studies in southeastern Montana conclude that detrimental effects of a particular mine on the groundwater resource are significant, though local in extent. Studies conclude that effects of any particular mine on the water quality of the Tongue River, while measurable, are slight and, considered alone, insignificant. These studies form the basis of the argument: If groundwater quality and quantity are affected locally by one mine, they will be affected regionally by many mines; and, if one mine will slightly decrease water quality of the Tongue River, many mines will decrease its water quality significantly.

5. Water quality in the Tongue River is generally very good. The Tongue River is classified as $B\text{-}D_3$ by the State of Montana. Beneficial uses for this classification are public water supply and propagation of non-salmonid fishes. The water meets nearly all the recommended limits of the U.S. Public Health Service drinking water standards. Sulfate, total dissolved solids and managanese concentrations have occasionally exceeded these limits. With respect to dissolved constituents, the Tongue River generally has the best overall water quality among streams in the coal region of southeastern Montana (Knapton and Ferriera, 1980).

6. Alluvial valley floors consisting of unconsolidated stream-laid deposits exist along the Tongue River and many of its tributaries (Malde and Boyles, 1976).

7. Alluvium of the Tongue River valley and many of its tributaries, and coal and clinker and sandstone of the Tongue River Member of the Fort Union Formation form the principal shallow aquifers in the area. Shallow bedrock aquifers (Tongue River Member) produce water of highly variable quality. Aquifer tests show wide ranges of transmissivity and hydraulic conductivity. Most values are very low relative to those found in other regions. Ashland, Montana, and many individual homes, farms and ranches derive relatively high quality water from Tongue River alluvium. Deep-rooted crops, such as alfalfa are sub-irrigated in the Tongue River bottomlands throughout much of the growing season. Groundwater quality and quantity from the Tongue River member aquifers is often barely adequate to sustain the farms and ranches which currently depend on it for survival (Van Voast, et. al., 1978; Woessner, et.al., 1980).

8. Water quality in the Tongue River downstream of the Tongue River Dam is a result of mixing of generally high quality mountain runoff upstream, lower quality groundwater discharge farther downstream, and the reservoir which stores and releases water, maintaining quantity and quality downstream throughout the irrigation season.

9. Studies made by federal and state agencies during

October and November, 1975, indicate that groundwater is a relatively small contributor to the total discharge of the Tongue River. A spatial analysis of these data, by Woessner, et al. (1980), shows that the area of greatest groundwater discharge to the Tongue River between the dam and Miles City is from the Birney Day School to a point about six miles north of the Northern Cheyenne Reservation, within the area addressed by this petition. This is likely a result of a favorable combination of topography, geology and precipitation in the recharge areas along this segment of the river. Thus, the area addressed by this petition is one of particular significance in the recharge, transmission and discharge of groundwater.

10. Impacts of coal mining on groundwater and surface water resources are well known and well documented. Studies by many researchers in southeast Montana (see Appendix B) document changes in aquifer characteristics, increases in total dissolved solids, nitrate, certain heavy metals, and lowering of water tables at Decker, Colstrip, and elsewhere in southeastern Montana during and/or within the short-term after mining. For example, studies at the West Decker Mine by VanVoast and Hedges (1975) showed that groundwater levels had declined 10 feet at one mile from the mine within the first year, and about twice that after two years. VanVoast, et al. (1977) found that at Colstrip, older mine spoils contain water more mineralized than undisturbed material and that both common (calcium, magnesium, sulfate) and trace (lead, nickel) elements are found in higher concentrations in the disturbed material. There currently, however, are no standard techniques available to

assess beforehand the degree of impact and long-term effects of strip mining on a given area (Rogowski, et al., 1977; Woessner, et al., 1979). For example, irrigation water may show an increase in sodium which might adversely affect the sodium adsorption ratio of irrigated soil.

11. Woessner and his colleagues have recently completed an analysis of the impacts of coal strip mining on the hydrogeologic system in and around the Northern Cheyenne Reservation (Woessner, et al., 1979; Woessner, et al., 1980). They developed a model to predict the effects of a single hypothetical nine million ton/year mine in the Tongue River valley. They considered only water quality impacts in terms of total dissolved solids; they did not consider potentially toxic or other potentially detrimental substances.

12. They concluded that a single mine would have a significant impact on groundwater quality, locally,and a minimal impact on Tongue River water quality. However, extensive mining of the strippable coal in the area addressed by this petition would cause significant regional changes. Most of the shallow groundwater in the mined areas, plus part of the downstream regions, would be of marginal use for stock and undesirable for other uses. Sub-irrigated crops in the alluvial valley may suffer if TDS rises above predicted levels. The quality of the Tongue River would also be affected if mining on a large scale ensues in the Tongue River valley.

13. Moreover, water quality impacts will not be short-lived. Low hydraulic conductivity of the spoils and small rates of recharge

combined with the tremendous volume of spoils would result in production and discharge of poor quality water from the spoils for hundreds of years (Woessner, et al., 1979). Water quality effects on the Tongue River itself will likely not be detected until it is too late. "Strip mining in the Tongue River Valley will necessarily imply a long-term degradation of water quality in the Tongue River. The changes will not occur rapidly, but will happen gradually over a period of years." (Woessner, et al., 1979)

14. The scenario envisioned by Woessner and his colleagues could be further aggravated by other events upstream. The State of Montana has determined the Tongue River Dam to be unable to withstand a probable maximum flood. Should the dam fail, a catastrophic flood would result. Six alternatives have been proposed to correct the problem (Karp, 1980). Four of these would involve cutting the present firm annual water supply by about two-thirds for a period of 15 to 20 years. Another would involve returning the river to its free-flowing state. All would affect water quality and quantity downstream to one extent or another and in different ways during the construction and post-construction phases.

15. If reclamation attempts fail increased sediment loads might result which would adversely affect water quality and further deteriorate the Tongue River, a stream in which the high quality of water is unique in the region.

16. It is my opinion that the granting of permits for mining in the Tongue River basin cited in this petition should not occur at this time. It is time to consider the cumulative effects of several mines on the water resource. Otherwise, a steady deterioration of groundwater and surface water quality will clearly occur. This will be exacerbated by ongoing and likely additional coal mining upstream in Montana and Wyoming, demands on water by large increases in population both in Montana and Wyoming, notably Sheridan, and the uncertainties surrounding the fate of the Tongue River Dam.

Tom Bateridge

Subscribed and sworn to in my
presence this 24th day of November, 1980

Missoula, MT.
exp. 7-06-82

Exhibit
APPENDIX A.

VITA

Thomas Bateridge

Business Address: Geoservices West
520 N. Pattee Street
P. O. Box 7182
Missoula, MT 59807
(406) 549-7909

Home Address: 1327 Jackson Street
Missoula, MT 59801
(406) 549-1009

Education

Ph.D. candidate in Geology, University of Montana, Missoula, Montana. Ph.D. expected 1981. Dissertation title: Determination of Geologic Weathering Rates on a Granitic Terrane in Western Montana.

M.S. in Soil Science, Montana State University, Bozeman, Montana. Paper title: The Salt Status of Glacial Till Soils of North Central Montana as Affected by Alternate Crop-Fallow Farming.

M.S. in Geology (Hydrology), University of Montana, Missoula, Montana, 1974. Thesis Title: Effects of Clearcutting on Water Discharge and Nutrient Loss, Bitterroot National Forest, Montana.

B.S. in Earth Science, Education, Bloomsburg State College, Bloomsburg, Pennsylvania, 1969.

Experience

Instructor of Earth Science and Physical Science, Mountain View High School, Kingsley, Pennsylvania, 1969-1972.

Teaching Assistant (Geology), University of Montana, 1972-1974; (Earth Science), Montana State University, 1975-1976; (Soil Science), Montana State University, 1976-1977.

Research Assistant (Geology), University of Montana, Summer, 1973. Master's thesis research involved determining the relationships between clearcutting, roadbuilding and stream discharge/water quality in three cut over and/or roaded watersheds.

Hydrologic Field Assistant, U.S. Geological Survey, Menlo Park, California, summer, 1974. Worked on the "Redwood Creek Project" of Dr. Richard Janda. Project designed to assess the impact of upstream commercial logging on the water quality, discharge, aquatic life, and morphology of Redwood Creek and its tributaries, particularly within Redwood National Park.

Publications

Bateridge, T., 1974. Effects of Clearcutting on Water Discharge and Nutrient Loss, Bitterroot National Forest, Montana. Montana University Joint Water Resources Center, Bozeman, Report No. 52, 68 p.

Ferguson, H., T. Bateridge, and R. Bellingham, 1980. The Salt Status of Glacial Till Soils of North Central Montana as Affected by Alternate Crop-fallow Farming. Soil Sci. Soc. Amer. Jour. in Review.

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Papers Presented

Bateridge, T., 1977. Determination of Geologic Weathering Rates. Paper presented at the annual meeting of the Montana Soil Cons. Soc., Missoula, March 18.

Bateridge, T., and H. Ferguson, 1980. Effects of Alternate Year Crop-fallow Agriculture on the Soluble Salt Content of Soil, Highwood Bench, Montana. Paper presented at the annual meeting of the Rocky Mountain Sec. Geol. Soc. Amer., Provo, Utah, April 29. Geol. Soc. Amer. Abstracts with Programs, v. 10, no. 5, p. 210.

Sarna-Wojcicki, A. M., Waitt, R. B., Shipley, Susan, McCoy, Gail, Meyer, C. E., Dzurisin, Daniel, Wood, S. H., Bateridge, Thomas, and Davis, J. O., 1980. Areal Distribution, Thickness and Composition of Volcanic Ash Erupted from Mount St. Helens on May 18, 1980. Paper Submitted to the Annual Meeting of the Geological Society of America.

Field Hydrogeologist, working on contract to University of Montana from Montana Department of Natural Resources and Conservation, Yellowstone River Basin Study, summer, 1975. Project designed to determine impact of potential coal resource development on the Yellowstone River and its tributaries.

Research Assistant (Geology), University of Montana, 1976-1979. Ph.D. research involved determination of rates of physical and chemical denudation of a national land surface through analysis of stream dissolved, suspended and bedload, meteoric input, soil chemical and mineralogical changes, and rock weathering considerations.

Geologist, University of Montana, summer, 1978. Supervised six field workers in sampling stream water, stream sediment and well water in Shelby, Montana and Great Falls, Montana 1^ox2^o sheets for the U.S. Department of Energy's National Uranium Resource Inventory, through Los Alamos Scientific Laboratory.

Hydrologist and soil scientist, and owner, Geoservices West, Missoula, Montana, January, 1979 to present. Engaged in various hydrologic, soils and geologic projects. Among these:

Analyses for environmental impact documents
Geochemical sampling and interpretation
Soil erosion, soil genesis as affected by land use
Surface runoff as affected by land use
Evaluation of groundwater resource
Evaluation of geologic hazards
Soil sampling, testing and interpretation
Water use computation and water rights documentation
Stream channel morphology/land use interrelationships

Exhibit 8

APPENDIX B. REFERENCES

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EXHIBIT 9

STATE OF MONTANA

BEFORE THE DEPARTMENT OF STATE LANDS

U.S. DEPARTMENT OF THE INTERIOR

BEFORE THE OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the Matter of Designating Certain Lands in Rosebud and Powder River Counties, Montana, as Unsuitable for Surface Coal Mining Operations	AFFIDAVIT OF RICHARD H. OPPER

County of Yellowstone)
)   ss:
State of Montana   )

RICHARD H. OPPER, being first duly sworn upon oath, deposes and says:

1. I am Richard H. Opper, and my address is P.O. Box 862, Billings, Montana, 59102.

2. I am a private consultant for soil studies and alternative energy projects. I hold a Masters degree in Soil Science from Montana State University. I completed a thesis, "Effects of Exchangeable Sodium Levels on Physical Properties of Coal Overburden Samples Having Differing Clay Mineralogy" in April, 1979. My resume is attached as Appendix A.

3. I have reviewed the pertinent literature (See Appendix B) and conducted an on-site field investigation of the area described by the petitioners which includes the Tongue River basin from Birney to Beaver Creek (see legal description in petition).

4. Reclamation of the land appears to be neither technologically nor economically feasible because of a combination of salty soils and shallow recoverable topsoils. Potential salt-related problems are explained below.

5. Soluble salts (salts not bound electrostatically to the negative charges in clay particles) hinder plant establishment, reduce yield and kill existing vegetation in two ways:

a. Any salt is directly toxic to plants if present in high enough concentrations (Buckman and Brady, 1969).

b. Salts compete for water with plant roots. Most salts exhibit hygroscopic properties. The charged surface of an ionized salt attracts water molecules (Baver, et al., 1972). Salts attract water so strongly they can compete for available soil water with plant roots (Buckman and Brady, 1969). Soluble salts can tie up most or all of the free soil water, rendering the water unavailable for plant use. Soil salinity is a critical factor in determining the suitability of an area for reclamation potential (Merrill, et al., 1980), particularly in the Northern Great Plains where available water is often a limiting factor for plant growth. Mean annual precipitation in the petition area is approximately 14 inches (Draft Environmental Statement, Northern Powder River Basin Coal, Montana, U.S. Dept. of Interior and Montana Dept. of State Lands).

6. Exchangeable sodium (Na+ ions which are bound electrostatically to clay surfaces) inhibits plant growth primarily because of its adverse effect on soil physical properties.

7. Clay particles saturated with calcium (Ca++) tend to clump together and form stable aggregates because calcium clays absorb only a limited amount of water (Blackmore and Miller, 1961). These soil aggregates are separated by large pore spaces which allow unrestricted movement of air and water through the soil.

8. Sodium saturated clays, on the other hand, tend to absorb an unlimited amount of water around the clay particle and its associated exchangeable Na+ ions (Norrish and Quirk, 1954). Sodium clays do not clump together to form stable aggregates. Water dissolves the clusters of soil particles. Individual sodium-saturated clay particles thus are free to move with the soil water. They may concentrate on the soil surface to form a hard crust which is difficult to penetrate by machinery, plant roots, or seedlings (Dollhopf, 1975; Richards, 1953; Moe et al., 1975). Clay particles may also clog pore spaces and prevent the free flow of air and water through the soil (McNeal and Coleman, 1966; Dixit and Lal, 1972). In either case, the ability of the soil to transmit water is impeded by the presence of high levels of exchangeable Na+ (Brooks, et al., 1956; Reeve, 1965; Waldron and Constantin, 1968; Opper, 1979). The combination of poor soil structure and lack of vegetative cover increase the susceptibility of soils to wind and water erosion.

9. The SAR (sodium adsorption ratio) estimates the percentage of Na+ held in exchangeable form by soil clays. The ESP (exchangeable sodium percentage) provides a direct measurement

of the percentage of clay exchange sites occupied by Na+. At low values (ESP less than 30) a correlation exists between ESP and SAR (U.S. Salinity Laboratory Staff, 1954). According to the U.S. Salinity Laboratory Staff (1954), the physical properties of "average" soils will deteriorate sufficiently to affect plant growth at SAR values of 15 or greater.

10. Recent evidence (Opper, 1979) has shown, however, that the type of clay found in soils and overburden is a factor too important to overlook in the classification of sodic soils. Soil and overburden physical properties (hydraulic conductivity, shrinkage, crusting strength) deteriorate at SAR values much lower than 15 when the clay fraction of the sample is dominated (greater than 40%) by smectite. The research indicates that smectite-rich soils should be considered sodic if they have an SAR value of about 8-10 or greater.

11. By destroying overburden strata, mining makes available more salts for translocation. Also, the loosening of the soil allows these salts to be more readily transported (Wiener, 1980). At the Decker Mine, Dept. of State Lands officials have already found evidence of salt translocation in reclaimed areas, graded spoils, and around ponds (Wiener, 1980), even though the effects of salt translocation often take decades to manifest themselves. Evidence shows that burial of salty or sodic material by relatively non-saline topsoil may only postpone consequences. Merrill, et al., (1980) has discussed the occurrence of salts and sodium diffusion from spoil material through non-saline topsoil to the soil surface.

The problem is aggravated, they determined, by several factors, including high sodium levels (greater than 11) and low hydraulic conductivity propoerties in the spoil material. A spoil material having clay fractions dominated by smectite also contributes to the upward translocation of salts. Increased burial depth of saline or sodic spoils was presumed to alleviate the problem. Researchers in North Dakota and Montana (Curry, 1976) have discussed the upward migration of salts, particularly in areas which receive small amounts of rainfall. Sandoval, Power, & Ries (1978) found that the current commitment to reclamation may require up to four feet of suitable soil be returned to cover sodic spoils.

12. In September, 1980, I visited the area covered in this petition and investigated the following sites:

Site #	Location
1	NE 1/4, NW 1/4, Sec. 16, T5S, R43E
2	NE 1/4, SE 1/4, Sec.34, T4S, R43E
3	NW 1/4, SE 1/4, Sec.36, T4S, R43E
4	SW 1/4, SW 1/4, Sec.32, T4S, R44E
5	SW 1/4, NW 1/4, Sec.16, T4S, R44E
6	SE 1/4, NE 1/4, Sec.16, T4S, R45E
7	SE 1/4, SW 1/4, Sec.36, T4S, R45E
8	SW 1/4, NE 1/4, Sec.16, T5S, R45E
9	NW 1/4, NE 1/4, Sec.23, T5S, R45E

a) Site #1 was characterized by an extremely sparse covering of grass. Patches of ground approximately 4-5 m^2 in area were observed which contained no vegetation. The surface soil was extremely compacted and exhibited very poor structure. It was apparent that the surface soil was either currently or formerly influenced by sodium. Salt seepage was apparent in road cuts near the site.

b) Site #2 was an irrigated hayfield which appeared to be productive. Adjacent to the field, however, was an extremely dense stand of greasewood, an indicator of sodium soils. Irrigation may have leached salts and sodium below the root zone in the hayfield, whereas the unirrigated adjacent lands had not been washed free of the salts. The haylands could not be used as an indicator of suitable recoverable topsoil for reclamation because they do not represent the dominant soil conditions in the area.

c) Sites #3-6 appeared to be covered by healthy stands of native vegetation. However, all sites were compacted at the surface and were characterized by the poor structural development that is usually a result of the influence of sodium.

d) Site #7 was the side of a hill in which salts had precipitated on the surface. Salt seepage was also apparent on hillsides adjacent to Site #7.

e) No evidence of the influence of salt was seen on Sites #8 and 9.

13. Pervasive signs of salt seepage, poor soil structure, sparse vegetation, and sodium and salt indicator plants illustrate that soluble salts and sodium represent significant problems for the petition area.

14. The U.S. Department of Interior, the Bureau of Land Management, and the Bureau of Reclamation (1977) performed a detailed soil survey of S.26, T4S, R45E on Otter Creek. Over 50% of the sec-

tion was classified as having either salinity or alkalinity (Na+) problems.

15. I have reviewed published and unpublished Soil Conservation Service Soil Survey information on soils in Powder River and Rosebud Counties. It appears that well over 50% of the soils in concern are potentially too shallow for recovery. Even if salt-free soils exist within the study area, it is unlikely they could be found in sufficient quantities for use in the burial of sodic/salty material. The available evidence indicates that lack of suitable topsoil would become a significant and possibly insurmountable obstacle to reclamation should surface mining occur within the petition area. Depth and amount of suitable topsoil must be investigated further.

16. The most detailed and informative soil data available was in the study Environmental Research & Technology (ERT) performed in conjunction with the Montco mine permit application. Excessive sodium (SAR greater than 15) and/or salts (greater than 4.0 mmhos/cm) were found in approximately 44% of the sites investigated. Electrical conductivity values ranged from near 0 to well over 25 mmhos/cm. Several SAR values exceeded 100. Interestingly, the soil chemical problems did not appear to be confined to the lowland areas adjacent to creeks, but were found throughout the ERT study area.

17. The X-Min Co. of Dillon, MT, analyzed several soil samples to determine the clay mineralogy. The data indicates all samples contain appreciable amounts of smectite clays. Smectite clays are more sensitive to exchangeable sodium, so the adverse effects of

Na+ are further aggravated.

18. Significantly, the only two studies which produced lab data (the Otter Creek East Study and the Montco mine application on the Tongue River) showed salt and sodium problems to be both pronounced and widespread within the areas investigated. It is unrealistic to assume that soil chemical and physical problems are restricted to these two areas. Rather, it is likely that salts and sodium are prevalent throughout the petition area. Extensive testing of both soil and overburden must be conducted in the entire area before any decision on the granting of permits is made. The availability of salt-free suitable topsoil must also be determined.

19. Reclamation of the lands covered in the petition may be neither technologically nor economically feasible. The only data available indicate that considerable salt and sodium problems exist in the area. Many sites exhibited the highest levels of salt and sodium of any area I have seen in Montana or Wyoming. The area appears to lack sufficient salt-free material to permit and adequate depth of burial of salty or sodic materials. Even where sufficient suitable topsoil may exist, the costs of hauling water, adding soil amendments, and providing drainage could be prohibitive.

Richard H. Opper

Subscribed and sworn in my presence
this 24th day of November, 1980.

Notary Public for the State of
Montana
Residing at: Billings, Montana
My Commission expires: 9/1/81

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Personal Resume for
Richard H. Opper

Present Address:

P.O.Box 862, Billings, MT 59102

Personal:

Age: 28 Height: 5'10" Weight: 145 lbs. Health: Excellent

Education:

1975-1977: Candidate M.S. Degree in Soil Science, Montana State University, Bozeman, MT 59717. (Received M.S. Degreee in April, 1979)

1970-1974: B.S. Degree in Agronomy, Oklahoma State University, Stillwater, OK 74074.

1966-1970: Graduated from Casady High School, Oklahoma City, OK 73120.

Job Experience:

Sept 1979-present: Private Consultant for soil studies Alternative Energy Projects.

May 1978-Sept 1979: Employed by HKM Associates, Billings, MT. Conducted irrigation suitability investigations on the Ft. Berthold, Ft. Apache, Jicarilla and Wind River Indian Reservations.

Aug. 1977- Feb. 1978: Research and Teaching Assistant, Washington State University, Pullman, WA.

1975-1977: Research Assistant, Montana State University, Bozeman, MT. Responsible for thesis-related research; specifically, the adverse effect of sodium on soil and overburden physical properties. Taught Intorductory Soils Lab. Guest Lecturer for several soil and range classes.

1974-1975: Research Assistant, Dept. of Reclamation Research, Montana State University, Bozeman, MT. Responsible for research, writing, and organization of overburden analysis study of potential mine sites.

Achievements:

Completed thesis "Effects of Exchangeable Sodium Levels on Physical Properties of Coal Overburden Samples Having Differing Clay Minerology. April, 1979.

Prepared "Overburden Analysis of Two Drilling Sites, Youngs Creek Study Area" Unpublished Montana Agricultural Experiment Station Bulletin 1975.

Presented thesis-related research paper at the 1979 Western Soil Science Meetings in Ft. Collins, CO.

Member of Soil Science Society of America, American Society of Agronomy, and International Soil Science Society.

References:

Dr. Hayden Ferguson, Dept. Head, Plant and Soil Science, Montana State University, Bozeman, MT 59717.

Dr. Murray Klages, Dept. of Plant and Soil Science, Montana State University, Bozeman, MT 59717.

Dr. Ed Depuit, Dept. of Reclamation Research, Montana State University, Bozeman, MT 59717.

EXHIBIT 9a

STATE OF MONTANA

BEFORE THE DEPARTMENT OF STATE LANDS

U.S. DEPARTMENT OF THE INTERIOR

BEFORE THE OFFICE OF SURFACE MINING, RECLAMATION, AND ENFORCEMENT

In the Matter of Designating Certain Lands in Rosebud and Powder River Counties, Montana, as Unsuitable for Surface Coal Mining Operations	AFFIDAVIT OF RICHARD H. OPPER

County of Yellowstone)
)   ss:
State of Montana   )

RICHARD H. OPPER, being first duly sworn upon oath, deposes and says:

1. I am Richard H. Opper, and my address is P.O. Box 862, Billings, Montana, 59102

2. I make this statement in support of the Petitioners request that certain lands in Rosebud and Powder River Counties, Montana, be designated as unsuitable for surface coal mining operations.

FIELD INVESTIGATION

3. On December 17, 1980, I conducted a second field investigation of lands included within the afffected area of the Lands Unsuitable Petition filed by the Northern Plains Resource Council and its afliates before the Office of Surface Mining, Reclamation, and enforcement, and the Montana Department of State Lands.

4. The second field investigation was conducted for the purpose of collecting evidence that would tend to establish the existence of soluble salt, and/or sodic problems in the northern and southern portion of the petition area.

5. In the southern petition area, the investigation covered:

T 5.S., R 42.E., M.P.M.
T 6.S., R 42.E., M.P.M.
T 6.S., R 43.E., M.P.M.

In the northern petition area, the investigation covered:

T 1.N., R 44.E., M.P.M.
T 1.S., R 44.E., M.P.M.

T 2.S., R 44.E., M.P.M.
T 3.S., R 44.E., M.P.M.

Two attempts were made to investigate T 1.S., R 45.E., but access proved impossible. Two access roads shown in the U.S. Department of the Interior, BLM, "Natural Resource Lands in Montana, (Tongue 38) map were impassable. The first which was shown as branching eastward from the main county road, (sec. 16, 1S.,R44E), was no longer in existence, and the second access, (sec 35, T 1S., R44E), proved impassable due to rough terrain and moist road conditions.

6. Two major access roads were available for travel in the southern petition area. The first road roughly paralled the east side of the Tongue River from Birney to the S.W. corner of the petition area, while the second headed due south of Birney along Hanging Woman Creek. While investigating these routes, the following specific sites were visited:

Site 1: SW¼, SW¼, sec. 29. T 6S., R 43E.
Site 2: NW¼, SW¼, sec. 29. T 6S., R 43E.
Site 3: NW¼, SW¼, sec. 18. T 6S., R 43E.

7. Blue grama was the dominant vegetation at site #1, although only approximately 50% of the soil was covered by plant growth. Big sage was not present in an area of ½ to 1 acre at the site, although it was common in areas adjacent to the site. Soils at the site were gravelly, containing approximately 10 to 40% gravel in the top 8 inches. Soils were characterized by a thin, strong platy structure to a depth of 8 inches. Investigation below 8 inches was prohibited by a combination of gravel, and tight compacted soil, (perhaps frozen). The sparce vegetation and platy soil structure evidenced at the site indicate the area may be adversely affected by soluble salts and/or sodium. The possibility of salt, and/or sodium influence is enhanced by the occurence of nearby salt seeps, (see description of site 2 below).

8. A salt crust was noted on a small hillside at site #2. The salts were evidently quite soluble. They coated the entire soil surface, not just the surface of stable rock and gravel as does the much less soluble salt, $CaCO_3$ Also, unlike $CaCO_3$ these deposits were salty to the taste. Greasewood, an indicator of salt or sodium soils was also noted growing at the site.

9. Site #3 was an extensive salt crust on a hillside about 3/4 of a mile south of Birney. Again, the salts appeared to be in a soluble form, judging from their uniform deposition on the hill and from their taste. Soluble salts such as found on this hillside adversely affect plant growth. As in the case of all the crusts found in the area, little vegetation was present on or around the salt affected area.

10. Salt affected areas were visible, not just at the three sites visited, but throughout the southern area of the petition. Salt deposits were common along the river, on bottomlands, on hillsides, and in roadcuts. The most prominent occurence of salts were visible and are designated in the map attached hereto, and by this reference incorporated herein as attachment A. Greasewood was seen growing on many hillsides adjacent to the Tongue River. It cannot be definitively

determined from this investigation whether the salts were predominantly calcic or sodic in composition, or whether all the soils in the area are affected to a greater or lesser degree by soluble salts and/or sodium. The abundance of salt crusts found throughout the southern portion of the petition area tends to establish that reclamation of this area may be neither technologically or economically feasible.

11. The area along the Tongue River from Ashland to the northern end of the petition area was also investigated. The following sites were visited.

Site #4: SE¼, NW¼, sec 2, T 3S., R 44E.
Site #5: NW¼, NE¼, sec 21, T 1S., R 44E.
Site #6: NE¼, SW¼, sec 33, T 1N., R 44E.
Site #7: SE¼, NW¼, sec 14, T 1N., R 44E.

12. Site #4 was a salt crust adjacent to the roadside. The crust was similar to those found in the southern portion of the petition area, in that the salt crust covered the entire soil surface and the deposits were salty to the taste. The top several inches were characterized by a well developed granular structure. This is consistent with the findings of researchers (Baver 1930) who have shown that high concentrations of soluble salts promote flocculation or the clumping together of soil particles. (good soil structure is often found in very salty soils)

13. Site #5 was a floodplain which appeared to have a very low productivity of vegetation. Sagebrush was absent from the site although it was found in adjacent areas. Soluble salts or sodium may have contributed to the low productivity of the area. Salt crusts were also visible in the hills to the west of the site.

14. An extensive deposit of soluble salts was seen on a hillside at site #6. The deposits were similar in appearence and taste to other salt crusts in the petition area.

15. Site #7 was a salt crust forming on bottomland adjacent to the Tongue River. Soils at the site were moist, possibly because the salts were hygroscopically attracting water to the surface.

16. Other areas in the northern portions of the petition area showed deposits of salt on bottomlands, hillsides, and roadcuts, as presented in the map attached hereto, and by this reference incorporated herein, as attachment B. Salt crusts in the northern portion investigated on this field trip, though appearing with perhaps less frequency than they did in the southern area of the petition, were nevertheless common enough to tend to establish that reclamation may not be economically or technologically feasible.

17. It was concluded on the basis of the literature review and the two field investigations, that salt and/or sodium problems were not limited to areas along the Tongue River between Ashland and Birney. Evidence of salt and/or sodium affected soils was found throughout the petition area. The data tends to establish that reclamation of the entire petition area is neither technologically nor economically feasible.

SHALLOW SOILS

18. I have reviewed published and unpublished U.S. Soil Conservation Service Soil Survey information on soils in Powder River and Rosebud Counties. Soil series which are less than 18" in depth are probably too shallow for use in reclamation. Soil associations comprised of one or more shallow series are potentially too shallow for recovery. It appears that well over 50% of the soils in the petition area are potentially too shallow for recovery. Even if salt-free soils existed in the petition area, it is unlikely that they could be found in sufficient quantities for use in the burial of sodic/salty material. The available evidence indicates that

lack of suitable topsoil would become a significant and possible insurmountable obstacle to reclamation should surface mining occur within the petition area.

Richard H. Opper

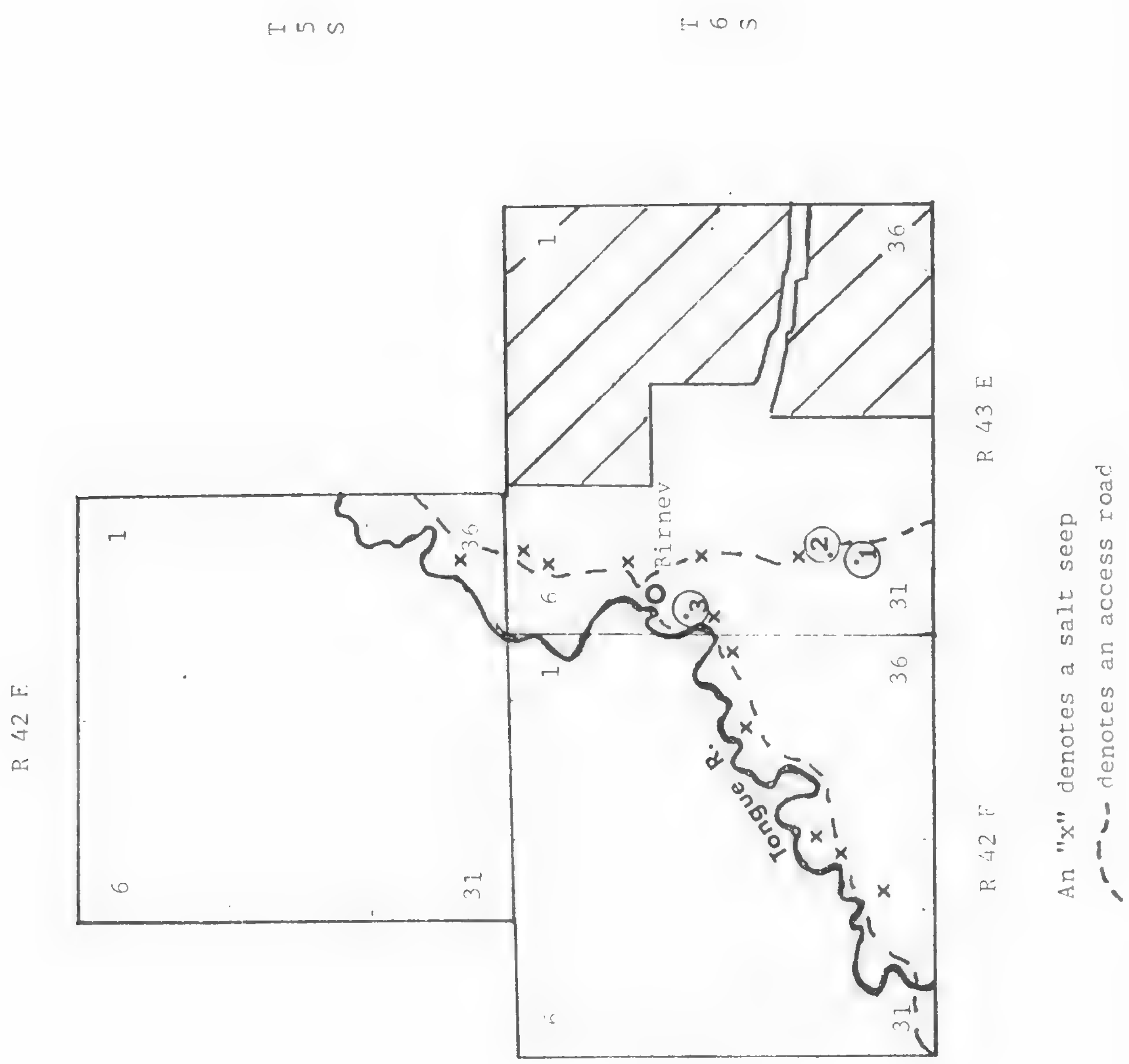
Richard H. Opper

Subscribed and sworn in my presence

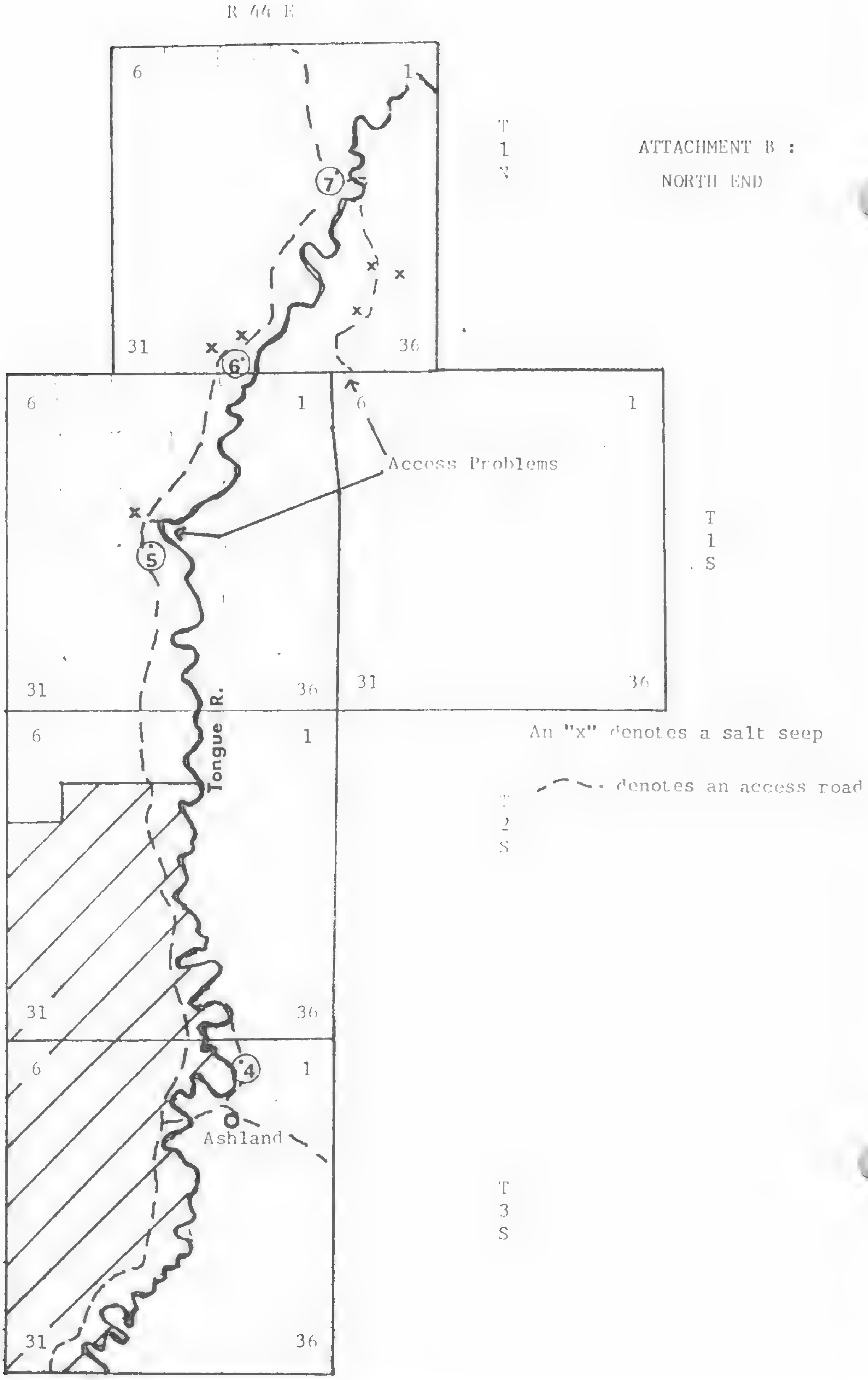
this 26th day of December. 1980

Notary Public for the
State of Montana
Residing at Billings, Mont
My Commission expires:
9/1/81

ATTACHMENT A : SOUTH END



ATTACHMENT B :
NORTH END



An "x" denotes a salt seep

- - - denotes an access road

EXHIBIT 10

MONTANA PROJECTED ANNUAL COAL PRODUCTION CAPACITY
[Millions of tons per year]

October, 1980
NPRB EIS

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Existing mines[1]												
Absaloka	5.3	5.4	7.3	7.3	7.8	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Big Sky	2.3	3.0	4.3	3.6	4.1	4.0	4.6	4.6	4.6	4.6	4.6	4.6
Brophy #2	---	---	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Decker East	6.2	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
West	7.0	6.8	3.9	3.7	3.8	4.6	5.2	5.4	5.5	5.5	5.6	5.6 ✓
Savage	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Spring Creek	---	0.2	5.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0 ✓
WECo Area A	5.9	6.1	2.6	2.8	4.2	4.9	4.9	4.9	4.9	4.9	2.8	0
Area B	1.6	2.1	6.5	7.2	5.5	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Area E	3.9	3.2	3.2	3.1	3.3	3.3	2.7	0	0	0	0	0
Total---------	32.5	33.7	39.8	40.8	42.8	45.7	46.3	43.8	43.9	43.9	41.9	40.0
Expected mines												
Consol CX Ranch	---	---	---	---	1.0	3.0	5.0	7.0	8.0	8.0	8.0	8.0 ✓
Decker North	0	0	1.1	1.5	1.6	2.0	2.0	2.5	2.5	2.5	2.4	2.4
Montco	---	---	---	---	---	1.0	2.0	4.0	6.0	6.0	6.0	9.0
PKS CX Ranch	---	---	---	---	---	1.0	2.0	4.0	4.0	4.0	4.0	4.0
WECo Area C[2]	0	0	0	0	1.4	4.2	5.6	5.6	5.6	5.6	5.6	5.6
Area D	0	0	0	0	0	0	0.6	3.8	3.8	3.8	3.8	3.8
Total----------	0	0	1.1	1.5	4.0	11.2	17.2	26.9	29.9	29.9	29.8	32.8
Possible mines												
Bear Tooth	---	---	---	---	---	0.3	0.5	1.5	1.5	2.0	2.0	2.0
Lousiana Land & Exploration			---	---	0.2	0.7	1.2	1.7	2.0	2.0	2.0	2.0
Northern Resources[3]	--	---	---	---	0.3	1.0	2.0	3.0	4.0	5.0	6.0	6.0
Shell Young's Creek	--	---	---	---	---	---	---	---	2.0	5.0	8.0	8.0 ✓
WECo Dominy	---	---	---	---	---	---	---	1.0	2.5	4.0	4.0	4.0
Total	0	0	0	0	0.5	2.0	3.7	7.2	12.0	18.0	22.0	22.0
Other mentioned mines												
Amoco	---	---	---	---	---	---	---	0.5	2.0	4.0	8.0	10.0
Cook Mountain[4]	---	---	---	---	---	---	---	---	3.0	6.0	10.0	10.0 ✓
Northern Minerals	---	---	---	---	---	---	---	---	---	3.0	8.0	13.0
Northern Resources	---	---	---	---	---	---	---	---	---	2.0	10.0	10.0
Otter Creek[4]	---	---	---	---	---	---	3.0	5.0	5.0	5.0	5.0	5.0
Tenneco	---	---	---	---	---	---	---	---	---	2.0	13.5	13.5
Tract II	(would probably not be developed in the near future unless the Absaloka mine were not to receive a needed permit)											
Wesco	---	---	---	---	---	---	---	---	---	2.0	10.0	12.0
Total	0	0	0	0	0	0	3.0	5.5	10.0	24.0	64.5	73.5
Grand Total[5]	32.5	33.7	40.9	42.3	47.3	58.9	70.2	83.4	95.8	115.8	158.2	167.3

[1] Existing mines are currently producing or under construction. Expected mines are extensions of existing mines or are those known to be actively preparing a permit application Possible mines are those which have a resource base which would support the production level, although some of the later mines would need a lease renewal. Other mentioned mines are those which would require renewed Federal, State or private leasing and many of these mines would not be developed without a major sythetic fuels subsidy effort.

[2] Assumes Colstrip Unit 3 goes online in late 1983

[3] Assumes that Basin Electric locates in Circle

[4] Assumes that the construction of the rail line into the Montco site results in development of this site, there are existing State and private leases.

[5] There are seven expressions of interest to lease new Federal coal in the Fort Union Coal Region and eleven in the Powder River Region that do not have enough information to include in this projection.

EXHIBIT 1

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